Establishing Fire in Planted Longleaf Pine

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Longleaf pine plantations can benefit from prescribed burning. As with natural stands, burning can reduce competition and recycle nutrients, thereby increasing growth and stimulating seedling emergence from the grass stage. Burning will also keep fuels from accumulating and reduce the risk of damaging wildfires. Although plantations do differ from natural stands, they can still be functioning communities and provide at least some of the habitat requirements for a number of plant and animal species. Because the longleaf ecosystem evolved with and is adapted to frequent fire, a regiment of prescribed fire will aid the development of a more natural system. This does not mean that prescribed fire alone is going to result in plantations having all the species and attributes of a health natural longleaf pine community, but it will reduce the amount of relative difference compared to unburned plantations.

As with all burning, there is the potential for negative impacts in longleaf plantations. The most obvious damage is direct tree mortality that can result from excessively hot burns that are too intense and kill tree crowns, including the buds. Tree mortality can also occur with low intensity but high severity fires that slowly consume accumulated forest floor, and because of their long residence time heat root and stem cambial cells beyond the lethal temperature of 140 °F. Trees suffering from such injury often retain a healthy looking green crown for some time following the burn, but will eventually die. Burning can also reduce tree growth if significant crown loss occurs. Even with no crown loss and only minimal scorch, biennial prescribed burning has been shown to reduce growth of natural longleaf pines, and would likely affect planted longleaf similarly. Younger trees seemed to be most susceptible to this growth loss. Smoke produced by the burn can also cause problems on adjacent lands and transportation corridors.

How then can we gain the benefits of burning and minimize the potential for negative consequences? The most important factor in accomplishing this goal is experience. This means seeking as much experienced professional help and advice as you can obtain until you become a qualified burner. Only through proper training and practice can you become proficient at selecting proper conditions and firing techniques that are likely to produce the desired outcomes. The U. S. Department of Agriculture, Forest Service, Southern Research Station (http://www.srs.fs.fed.us) has a number of relevant publications. Considerable advice and guidance is also available from state forestry agencies and Forestry units of southern universities. In some locations, it is possible to get contract burning done by consulting forestry businesses.

Precautions specific to planted longleaf include delaying the first burn until seedlings are well established, i.e. two full growing seasons. This allows time for seedlings to develop a good root system and to accumulate carbohydrate reserves needed to begin height growth. Spring growing season burns are most effective for stimulating growth in natural grass stage seedlings and should be favored for planted seedlings as well. The exact timing will vary depending on location, but burning should be conducted prior to bud elongation to minimize the risk of damage. Burning should be avoided in young plantations just coming out of the grass stage, because this is when seedlings are most susceptible to fire caused damage and mortality. Some larger landowners often have stands of this type intermixed with stands of more mature longleaf. These bolting stage stands can be safely burned with the rest of the area, to avoid creating excess fire lines, if fuel loads are moderate to light and the understory is dominated by grasses. Again, avoid the candle stage to minimize potential mortality in the young plantations.

Growing season burns are also preferable for older sapling sized plantations, but they can also be burned during the dormant season if that is the only time when conditions are favorable and people and equipment are available. A dormant season burn is preferable to no burn and in fact, some variation is desirable. Thus, a program where every third or fourth burn is done during the dormant season is a good approach. Variation in fire return interval and month of burning is also desirable to give different species opportunities for reproduction and growth. Burning during September should be avoided because experience has shown that the probability of significant mortality, even in larger longleaf, is much higher at this time of the year. Because of the potential for growth loss in younger plantations, burns should be scheduled as infrequently as possible during the first 15 to 20 years. Burn just often enough to control woody competition and keep fuel loads at reasonable levels. This of course will vary from site to site, with fuel loads and competition increasing more rapidly on the more productive sites. Periodic removal of pine straw can help reduce fuel loads, thereby increasing the time between burns, and it produces considerable income. However, pine straw removal can also reduce growth if done annually on sites with infertile soils, and can damage native understory plants if mechanical raking equipment is used.

Once plantations reach age 20, they can be burned more often if desired to meet other management objectives, such as forage production or improved quail habitat. In plantations that have not been burned for 10 or more years, there is an excessive buildup of litter around the base of trees. Reintroduction of burning in these stands without excess mortality is best accomplished by a series of dormant season burns (see article by Dale Wade for more information).